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An electro-mechanical screw actuator assembly

The present invention refers to an electro-mechanical screw actuator assembly of the type mentioned in the preamble of claim 1. Such an assembly is known from US 6 325 180 B1.

Actuator assemblies of the above type are known, for example, from US-6 315 092. These actuators are applied in various fields, for example in the automotive field for actuating brakes, friction clutches, gearboxes, etc. An electric motor, mounted within a housing fixable to the vehicle, drives for rotation a nut member of a screw mechanism through a gear reduction system. The screw mechanism comprises a screw connected to a piston actuating head which is imparted a reversible linear motion with a high actuating force.

The object of the present invention is to provide an electro-mechanical screw actuator assembly having few components, of compact dimensions and with a low inertia. Another object of the invention is to provide an actuator assembly particularly well suited for application onto a brake calliper and capable of performing also a parking brake function. A further object of the invention is to provide an electromechanical actuator assembly in which the electric motor is protected from contaminating agents such as grease, dirt and metal particles.

The foregoing, as well as other objects and advantages, that will be better understood herein after, are achieved according to the invention by an electro-mechanical actuator assembly having the features defined in the appended claims.

The constructional and functional features of a few preferred

these two members.

The piston member 70 has a cylindrical surface 73 accommodated with a slight radial play and axially guided within a cylindrical bore 24 of the central tubular portion 21 of the supporting body 20. Preferably, a splined or equivalent coupling 26 is provided at the interface between the bore 24 and the cylindrical surface 73 of the piston to prevent relative rotation between the piston and the stationary parts of the actuator. To this end, also a key coupling may be used.

A threaded locking member 80 is screwed in the outer portion 47 of the sleeve member 45 to axially lock onto the housing 11 the subassembly comprised of the sleeve member 45, the angular contact ball bearing 44 and the nut 61.

When the electric motor 30 is activated, the rotor 34 drives the nut 61 for rotation through the planetary gear reduction system 50. The rotary motion of the nut is converted into a linear translation motion of the screw 62 through the recirculating balls (not shown), causing extension or withdrawal of the piston member 70, according to the direction of rotation imparted by the electric motor.

As will be appreciated, the invention entails the following advantages:

- as the rotor 34 directly carries the satellites of the planetary gear reduction system, there is eliminated a transmission member provided with conventional solutions for transmitting motion from the rotor to other toothed members of the reduction system, and, consequently, the invention attains a reduction of the-number of components, a reduction

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CLAIMS

1. An electro-mechanical screw actuator assembly, of the type comprising:

an electric motor (30) with a stator (31) and a rotor (34),

a screw mechanism (60), including a rotatable nut (61) and a central screw (62) translatable along a given axis (x),

a planetary gear reduction system (50), disposed between the rotor (34) and the screw mechanism (60) for driving this mechanism, the gear reduction system (50) including a plurality of satellite gears (52);

characterized in that the rotor (34) provides a plurality of axially protruding pins (51) for rotatably supporting the satellite gears (52).

2. An actuator assembly according to claim 1, characterized in that the rotor (34) has an outer peripheral toothing (37).

3. An actuator assembly according to claim 2, characterized in that at least the toothing (37) of the rotor is made of metallic material.

4. An actuator assembly according to claim 2 or 3, characterized in that the toothing (37) is formed as a single piece with the rotor (34).

5. An actuator assembly according to any one of claims 2 to 4, characterized in that the toothing (37) is carried or formed by a peripheral edge of a radial flange (36) of the rotor (34), and that the flange (36) provides said plurality of axially protruding pins (51) for rotatably supporting the satellite gears (52).

6. An actuator assembly according to claim 3, characterized

